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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/639,587	08/13/2003	Toshiaki Okuno	50212-524	7692

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EXAMINER	
CURS, NATHAN M	
ART UNIT	PAPER NUMBER
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/639,587	OKUNO, TOSHIAKI	
	Examiner	Art Unit	
	Nathan Curs	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4,8,9,15,19 and 20* is/are allowed.

6)☒ Claim(s) *1-3,5-7,10-14,16-18,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 5, 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189).

Regarding claims 1 and 12, Zhou discloses an optical transmission system, comprising: an optical transmitter including a light source, said optical transmitter outputting signal light in a signal wavelength band and an optical receiver receiving the signal light outputted from said optical transmitter (fig. 1 and paragraph 0028); an optical fiber transmission line for transmitting the signal light outputted from said optical transmitter as a transmission medium provided between said optical transmitter and said optical receiver, said optical fiber transmission line having a positive chromatic dispersion at an operation wavelength of said direct modulation light source (fig. 1 and paragraphs 0034 and 0035); and at least one non-temperature controlled dispersion compensator provided on an optical path either between the signal outputting end of said optical transmitter and the signal entering end of said optical fiber transmission line (fig. 2c and paragraphs 0056 and 0057) or between the signal receiving end of said optical receiver and

the signal emitting end of said optical fiber transmission line (fig. 2a and paragraphs 0037-0040). Zhou discloses a WDM system but does not disclose that the optical transmitter light source is a non-temperature controlled direct modulation CWDM light source. Deng discloses that inexpensive, non-temperature controlled lasers in WDM systems can be used with sufficient wavelength spacing (abstract and paragraph 0016). It would have been obvious to one of ordinary skill in the art at the time of the invention to use non-temperature controlled lasers and sufficient wavelength spacing in the WDM, to avoid the additional cost associated with temperature controlled lasers, as taught by Deng. Zhou discloses that the dispersion after compensation is zero or a predetermined value of residual dispersion (paragraph 0040), but does not explicitly disclose that, at either the signal emitting end of said optical fiber transmission line or at the signal receiving end of said optical receiver, respectively, the accumulated chromatic dispersion at the operation wavelength is set to negative. Essiambre discloses that using small negative residual dispersion results in better transmission performance than zero or slightly positive residual dispersion (paragraphs 0030, 0039 and 0040). It would have been obvious to one of ordinary skill in the art at the time of the invention to use dispersion compensation that produces small negative residual dispersion for the system of Zhou, in order to achieve the best transmission performance, as taught by Essiambre. Zhou does not disclose that the system operates over a temperature range of 0.degree.C. to 60.degree.C; however, Miller discloses that normal operating temperature for optical fiber system is –40.degrees.C to 80.degrees.C (col. 1, lines 16-19 and col. 4, lines 47-51). It would have been obvious to one of ordinary skill in the art at the time of the invention to operate the system of Zhou within the range of 0.degrees.C to 60.degrees.C since this is one of numerous acceptable operating ranges for an optical fiber system based on the teaching of Miller.

Regarding claims 5 and 16, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, wherein said optical fiber transmission line includes a single-mode optical fiber (Zhou: paragraph 0034), which inherent has a zero-dispersion wavelength of near 1.3 .mu.m.

3. Claims 2, 3, 6, 7, 13, 14, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of Kartalopoulos ("Introduction to DWDM Technology"; IEEE Press; 2000; pages 50, 51 and 55).

Regarding claims 2 and 13, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, further comprising a demultiplexer for demultiplexing a plurality of signal channels propagating through said optical fiber transmission line into one signal channel group in a first wavelength band and the other signal channel group in a second wavelength band (Zhou: fig. 2a), wherein said dispersion compensator compensates for the accumulated chromatic dispersion in the signal channel group of the second wavelength band (paragraphs 0037-0040), and wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in one of the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0.degree.C. to 60.degree.C (Essiambre: paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination). The combination of Zhou, Deng, Essiambre and Miller

discloses WDM and EDFAs, but does not disclose that the first wavelength band includes a zero-dispersion wavelength of said optical fiber transmission line. However, Kartalopoulos discloses using dispersion-shifted fiber with a WDM system having a zero-dispersion point shifted at 1550 nm (pages 50 and 51, section 3.13). It would have been obvious to one of ordinary skill in the art at the time of the invention to use DSF with the WDM system of the combination, in order to provide the benefit of using fiber that is designed to be compatible with amplifiers that operating in the 1550 nm range for WDM, such as EDFAs.

Regarding claims 3 and 14, the combination of Zhou, Deng, Essiambre, Miller and Kartolopoulos discloses an optical transmission system according to claims 2 and 13, wherein, at the signal outputting end of said dispersion compensator, the accumulated chromatic dispersion in all the signal channels of the second wavelength band passing through said dispersion compensator is negative over the temperature range of 0.degree. C. to 60.degree. C (Essiambre: paragraphs 0030, 0039 and 0040, and Miller: col. 1, lines 16-19 and col. 4, lines 47-51, as applicable in the combination).

Regarding claims 6 and 17, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line, at a wavelength of 1.38 .mu.m, has a transmission loss smaller than a transmission loss at a wavelength of 1.31 .mu.m. Kartalopoulos discloses AllWave fiber, based on SMF with the OH radical removed, and where loss at 1380 nm is less than at 1310 nm (fig. 3.16 and page 55). It would have been obvious to one of ordinary skill in the art at the time of the invention to use AllWave fiber, to provide the benefit of more wavelengths available in the transmission spectrum, due to the removal of the OH radical impact on transmission loss.

Regarding claims 7 and 18, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose that said optical fiber transmission line has a zero-dispersion wavelength which exists in a wavelength range of 1.35 .mu.m to 1.5 .mu.m. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Kartalopoulos with the combination as described above for claims 2 and 13.

4. Claims 10, 11, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhou et al. ("Zhou") (US Patent Application Publication No. 2002/0021862), in view of Deng et al. ("Deng") (US Patent Application Publication No. 2002/0196491), and further in view of Essiambre et al. ("Essiambre") (US Patent Application Publication No. 2004/0208617), and further in view of Miller (US Patent No. 6044189) as applied to claims 1, 5, 12 and 16 above, and further in view of Gabitov (US Patent Application Publication No. 2002/0048070).

Regarding claims 10 and 21, the combination of Zhou, Deng, Essiambre and Miller discloses an optical transmission system according to claims 1 and 12, but does not disclose pumping light supply means for supplying Raman-amplification pumping light into said optical fiber transmission line, so as to Raman-amplifying the signal light propagating through said optical fiber transmission line. Gabitov discloses opening up the 1300 nm range for WDM transmission in a WDM system by using Raman amp with a pumping light center at 1240 nm (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a Raman amp with a pump light centered at 1240 nm in the system of the combination, to provide the benefit of opening the 1300 nm transmission window for greater WDM transmission, as taught by Gabitov.

Regarding claims 11 and 22, the combination of Zhou, Deng, Essiambre, Miller and Gabitov discloses an optical transmission system according to claims 10 and 21, wherein said pumping light supply means supplies the Raman-amplification pumping light of a plurality of pumping channels included in a wavelength range of 1.2 .mu.m to 1.3 .mu.m into said optical fiber transmission line (Gabitov: abstract, as applicable in the combination).

Allowable Subject Matter

5. Claims 4, 8, 9, 15, 19 and 20 are allowed.

Response to Arguments

6. Applicant's arguments filed 8 January 2007 have been fully considered but they are not persuasive.

Regarding claims 1, 5, 12 and 16, and depending claims, the applicant argues that the combination of Zhou, Deng and Essiambre does not teach all the claimed limitations. However, it appears the arguments are actually based on an assertion that the combination is improper, not that the combination fails to disclose the claimed limitations. The applicant argues that individual references don't disclose certain limitations, but if an individual reference did discloses all the limitations, there would anticipation under 35 USC § 102, not obviousness under 35 USC § 103. If the combination is proper, all the limitations are disclosed, including the amended CWDM limitation (the combination of Zhou and Deng results in "sufficiently wavelength spacing" for non-temperature controlled light sources, which reads on CWDM).

With respect to the applicant's assertions that the combination is improper, the applicant first argues that Zhou is a DWDM system and that non-temperature controlled light sources like that taught by Deng are not applicable to the Zhou DWDM system because wavelength

fluctuation would occur with a non-temperature controlled light source. However, the combination is based on modifying Zhou based on Deng, including modifying Zhou to have the sufficient wavelength spacing required when using non-temperature controlled light sources like that of Deng. Zhou's generally use of the term "DWDM" does not disable the modification, because it's evident from Zhou's overall disclosure that Zhou is not concerned with keeping channel density above a certain threshold or with keeping wavelength spacing below a certain threshold, and is instead concerned with compensating for dispersion that would otherwise impact total channel count in general. The applicant also argues that there is no motivation to modify Zhou based on Deng. However, the motivation for combining Deng and Zhou, "to avoid the additional cost associated with temperature controlled lasers", as recited in the rejection, is straightforwardly based on Deng's disclosure of the inexpense of non-temperature controlled lasers. Therefore, the argument that there is no motivation to combine is not persuasive and seemingly ignores the actual motivation statement provided in the rejection.

The applicant also argues against the combination of Zhou and Essiambre, stating that CWDM systems do not generally carry out dispersion compensation and that accumulated chromatic dispersion in the claimed system is consistently negative over the temperature range in use. First, the idea of carrying out no dispersion compensation at all is irrelevant to both the applicant's claims and the applied prior art. Second, accumulated chromatic dispersion in the combination of Zhou and Essiambre is consistently negative; the limitation of temperature range involves further combination with Miller and thus is not based on Essiambre. The applicant argues against combination with Essiambre by asserting that there is no motivation to combine because Zhou discloses setting the dispersion near zero. This argument is not persuasive because it seemingly ignores the motivation provided by Essiambre himself, as described in rejections, where Essiambre discloses that small negative residual dispersion results in better

transmission performance than zero or slightly positive residual dispersion, such as that of Zhou.

The applicant also argues that Essiambre teaches a DWDM system and that in this kind of system external modulation light sources are generally used. However, Essiambre does not mention DWDM or externally modulated light sources. The applicant also argues that direct modulation light sources could not be used in the system of Essiambre to achieve the results of applicant's fig. 4. This argument is not persuasive, because the idea of using direct modulation light sources in Essiambre is not applicable to the combination. The relevant teaching from Essiambre is his observation that residual negative dispersion provides better performance that zero or residual positive dispersion.

The applicant also argues that Essiambre doesn't teach that "the accumulated chromatic dispersion at the operation wavelength is set to negative over a temperature range of 0 degrees C to 60 degrees C, at the signal emitting end of the optical fiber transmission line," as claimed. However, the rejections don't assert that these multiple limitations are read on solely by Essiambre. Again, Essiambre is relevant in combination to the negative dispersion limitation, Miller is relevant in combination to the temperature range limitation, etc. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

8. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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